

Jones & Stokes Associates, Inc.

Figure 1
Location of Water Quality Stations on the San Joaquin River in the Vicinity of Stockton

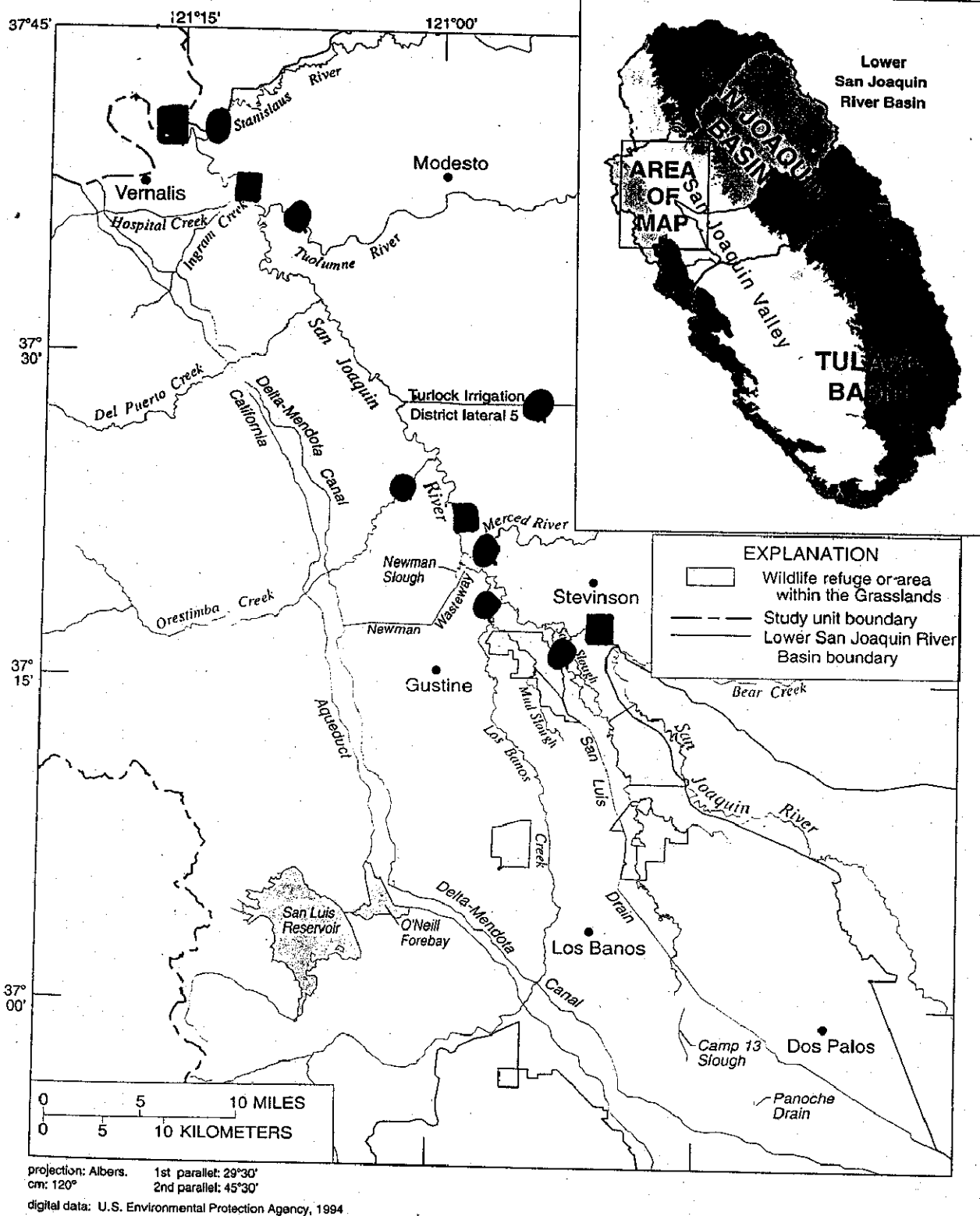
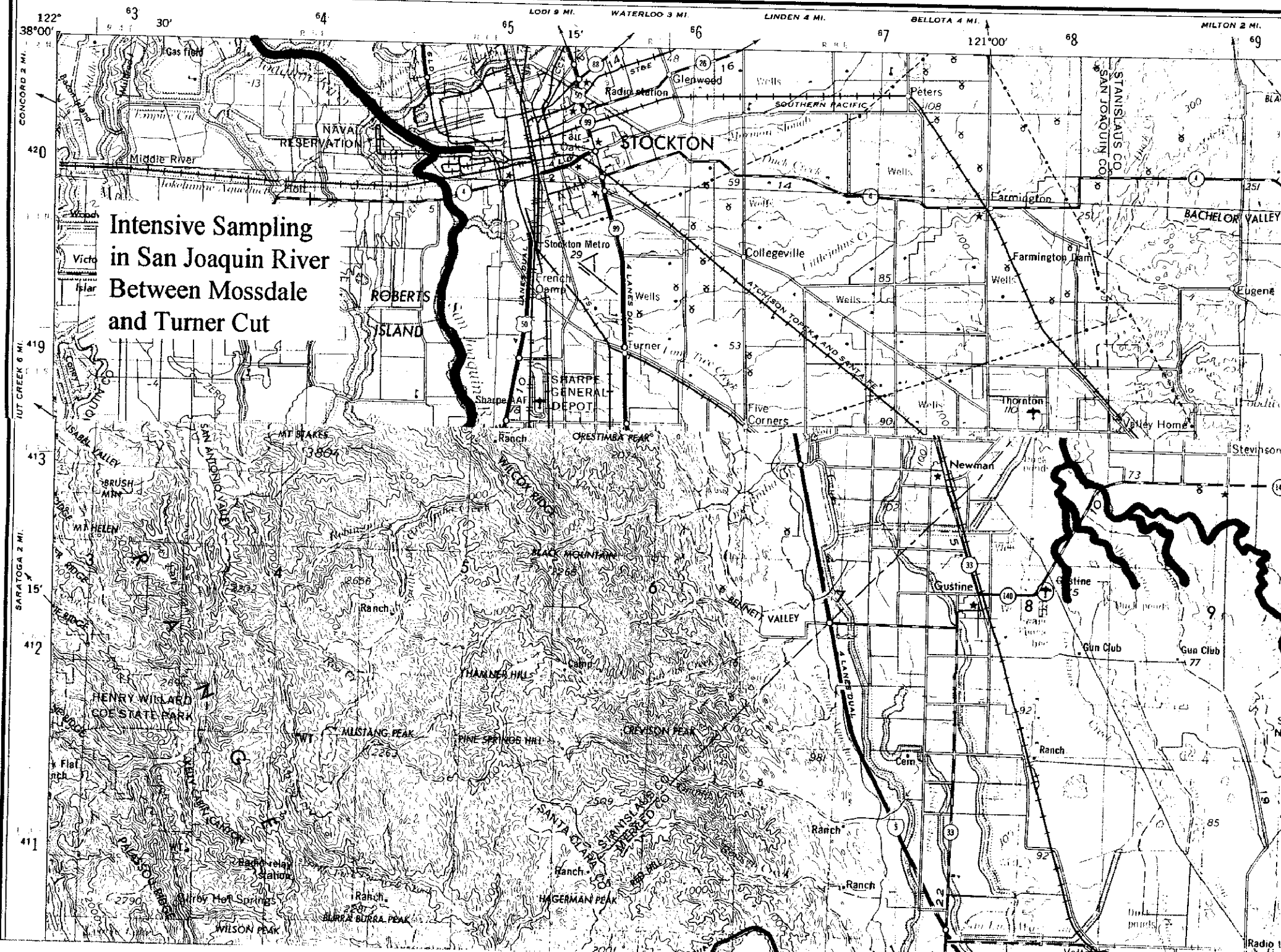


Figure 2. Proposed Upstream Sampling Stations for Source Identification

From USGS Professional Paper 1587

■ RWCB
● initial stations

USGS





San Joaquin River Dissolved Oxygen TMDL Steering Committee
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April 12, 1999

Clerk of the Board of Supervisors
San Joaquin County
222 East Weber Street, Room 701
Stockton CA 95202

CALFED PROPOSAL: SAN JOAQUIN RIVER DISSOLVED OXYGEN ISSUE

This letter will serve to notify you that the San Joaquin River Dissolved Oxygen TMDL Steering Committee is intending to submit a grant application to CALFED for the purpose of study and evaluation of the dissolved oxygen levels in the lower San Joaquin River. The San Joaquin River Dissolved Oxygen TMDL Steering Committee is a group of stakeholders including the Cities of Stockton, Lathrop, Tracy, Manteca, Ripon, Modesto and Turlock; State and Federal resource agencies; local and State Farm Bureaus; the DeltaKeeper, and others interested in devising a total maximum daily load for oxygen in the San Joaquin River in accordance with EPA Guidelines.

The lower San Joaquin River experiences episodes of very low dissolved oxygen concentrations in the summer and late fall of most years. This presents a very significant barrier to the migration of fall-run Chinook salmon, and this also represents an ecological stressor to resident fish and aquatic species. The goal of the study proposed by the San Joaquin River Dissolved Oxygen TMDL Steering Committee is to improve River quality, eliminate the oxygen sag in the River, and insure the passage of salmon to the headwaters for spawning.

The CALFED grant will allow for the mechanisms that result in the dissolved oxygen sag to be scientifically studied so that a series of solutions to resolve this problem may be facilitated. Our proposal has broad support, and will also assist San Joaquin County and the surrounding cities in dealing with a regional problem that must have a regional solution.

This notification is required as a part of the CALFED proposal process and is intended to inform the County of the proposed project and its general goals and objectives. If you have any questions or concerns regarding the grant proposal or this notification, please call Mr. Donald Dodge or me at the City of Stockton, at 937-8700.

MORRIS L. ALLEN

For the San Joaquin River Dissolved Oxygen TMDL Steering Committee

MLA:db



CITY OF STOCKTON

OFFICE OF THE CITY MANAGER

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April 14, 1999

Peggy Lehman, Ph.D
Department of Water Resources
3251 S Street
Sacramento CA 95816

CALFED GRANT APPLICATION: SAN JOAQUIN RIVER DISSOLVED OXYGEN

This letter is to describe the cost sharing proposed by the City of Stockton for the CALFED grant proposal. The cost sharing by the City of Stockton discussed in my letter will include both in-kind services and direct financial contributions to the program.

As you will recall, the City of Stockton has already expended considerable funds for the development of the San Joaquin River Water Quality Model (the Chen Model). We have also funded the services of technical experts to participate in the Stakeholder Process, develop the CALFED proposal, and prepare the TMDL Program Master Plan. We have also provided funding for and retained Kevin Wolfe Associates to act as the Committee's interim meeting facilitator for the last four months.

On an ongoing basis, the City of Stockton is prepared to make the following additional commitments:

1. The City will fund the services of Systech Engineering and Jones and Stokes Associates to support the Stakeholder Process, Technical Committee, and related activities. The in-kind contribution of these services is expected to total up to \$150,000 during calendar year 1999.
2. The City will also commit to funding of the management, administration, and facilitation of the Stakeholder process. While no budget for these activities has been established, the City is willing to pledge the sum of \$50,000 per year for these services for the next three years. If this amount exceeds the amount needed, any unused funds may be reallocated to item 3.b. below.

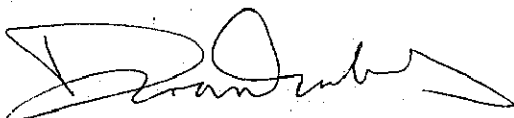


CALFED GRANT APPLICATION: SAN JOAQUIN RIVER DISSOLVED OXYGEN

3. The City will also provide either services or funding for services related to the CALFED grant studies as follows:
 - a. The City will purchase, install operate and maintain a Turner flourometer for monitoring chlorophyll levels in the San Joaquin River near Stockton. The cost of purchase and installation is expected to be \$15,000. Operation and maintenance costs, including additional laboratory sampling and analysis, are estimated to be \$10,000 per year. The cost for this item would therefore total \$45,000 over three years.
 - b. The City will provide approximately \$150,000 over the life of the study in other direct financial contributions. I would anticipate that such expenditures could be for reaeration tests in the Deep Water Channel in cooperation with the Corps of Engineers, hydroacoutic stations to monitor fish populations and movement, or other items.

In total, this represents direct and in-kind contributions of nearly \$500,000, exclusive of current staff support of the TMDL process and expected technical support beyond 1999.

The City of Stockton appreciates the effort you have already expended to supervise the development of the CALFED proposal, and looks forward to working with you on these issues. Please contact me should you have any questions or need additional information.



DWANE MILNES
CITY MANAGER

DM:PS:ma



California Regional Water Quality Control Board

Central Valley Region

Steven T. Butler, Acting Chair



Winston H. Hickox
Secretary for
Environmental
Protection

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Gray Davis
Governor

TO: Dr. Peggy W. Lehman
Principal Investigator

FROM: Jerry Bruns
Sr. L&WU Analyst

DATE: April 13, 1999

SIGNATURE: *Jerry Bruns*

SUBJECT: REGIONAL BOARD COMMITMENT OF RESOURCES TO PARTICIPATE IN THE CALFED PROPOSAL TITLED "DETERMINATION OF THE CAUSES OF DISSOLVED OXYGEN DEPLETION IN THE SAN JOAQUIN RIVER"

The Regional Board is committed to working with stakeholders to develop solutions to the dissolved oxygen problem in the San Joaquin River near Stockton. The Regional Board supports the proposal that is being developed and is willing to contribute to the effort by collecting weekly or bimonthly water samples from the San Joaquin River at Vernalis and have the samples analyzed for nutrients and BOD by the Regional Board's contract laboratory. Sampling and analysis has been initiated (as of March 1999) and will continue for two years but may be redirected to other locations at the request of the San Joaquin River TMDL Technical Advisory Committee. This contribution of resources is equivalent to \$15,000 per year or \$30,000 for the 2-year life of the proposal.

California Environmental Protection Agency



	Oxygen Depletion Budget										
Task 1			direct labor (hrs)	direct salary and benefits	service contracts	material acquisition	overhead	Total year 1	Total year 2	Total year 3	Grand Total
	Project Management	contracts, tracking and deliverables	478	20646			11987	32633	32633	32633	97899
		CSUS Foundation indirect cost (20%)						144401	125377	125377	395155
Task 2											
	Data Collection	Database development	280	13812		167	12788	26767	26767	26767	80301
		Continuous surface source monitoring	1262	11122	49880	36000	11122	108124	13000	13000	134124
		Tidal variation	600	11375	23000	700	5181	40256	40256	40256	120768
		Discrete surface source monitoring	208	2207	24200		2207	28614	28614	28614	85842
		Biomarker	1044	22745		10000	15921	48666	48666	48666	145998
		Sediment oxygen demand	830	27454	10660	37160	24125	99399	99399	99399	298197
Task 3	Data synthesis and modeling										
	Data synthesis	Continuous surface source monitoring	1044	24208			14802	39010	39010	39010	117030
		Tidal variation	75	1677		200	749	2626	2626	2626	7878
		Discrete surface source monitoring	1302	42327			18933	61260	61260	61260	183780
		Biomarker	348	7582			5307	12889	12889	12889	38667
		Sediment demand	561	19280			13024	32304	32304	32304	96912
	Modeling	modeling	673	33638		200	31662	65500	65500	65500	196500
Task 4	Evaluate alternatives and develop										
	Empirical analysis	Database	133	7000			7000	14000	14000	14000	42000
		Continuous sources	87	2600			2600	5200	5200	5200	15600
		Tidal variation	150	3354			1498	4852	4852	4852	14556
		Discrete surface source monitoring	87	2600			2600	5200	5200	5200	15600
		Sediment sources	87	4686			2975	7661	7661	7661	22983

[illegible]

Oxygen Depletion

YEAR 1

Task		Jly-Sep 99	Oct-Dec 99	Jan-Mar 00	Apr-Jun 00
Task 1	Project Management				
	Technical	8158	8158	8158	8158
	CSUS Foundation (20%)	36100	36100	36100	36100
Task 2	Data Collection				
	Database	6692	6692	6692	6692
	Continuous	54062	54062	0	0
	Discrete	14907	14907	0	0
	Tidal	20128	20128		
	Biomarker	23333	23333		
	Sediment demand	53793	53793		
Task 3	Data synthesis and modeling				
	Data synthesis				
	Conintuous			19505	19505
	Discrete			27022	27022
	Tidal			1313	1313
	Biomarker			7778	7778
	Sediment demand			16152	16152
	Modeling				
	Modeling	16375	16375	16375	16375
Task 4	Alternatives and Management Plan				
	Database	3500	3500	3500	3500
	Continuous			2600	2600
	Discrete			2600	2600
	Tidal			2426	2426
	Sediment demand			3830	3830
	Modeling	4087	4087	4087	4087
Task 5	Reporting				
	Database	5526	5526	5526	5526
	Continuous	1300	1300	1300	1300
	Discrete	1300	1300	1300	1300
	Tidal	607	607	607	607
	Biomarker	1944	1944	1944	1944
	Sediment demand	3831	3831	3831	3831
	Modeling	3500	3500	3500	3500
Total		259143	259143	176146	176146

Oxygen Depletion

YEAR 2

Task		Jly-Sep 00	Oct-Dec 00	Jan-Mar 01	Apr-Jun 01
Project					
Task 1	Management	Technical	8158	8158	8158
		CSUS Foundation (20%)	31344	31344	31344
Task 2 Data Collection					
		Database	6692	6692	6692
		Continuous	3842	3842	0
		Discrete	14907	14907	0
		Tidal	20128	20128	
		Biomarker	23333	23333	
		Sediment demand	53793	53793	
Task 3	Data synthesis and modeling				
	Data synthesis				
		Conintuous		19505	19505
		Discrete		27022	27022
		Tidal		1313	1313
		Biomarker		7778	7778
		Sediment demand		16152	16152
	Modeling				
		Modeling	16375	16375	16375
Alternatives and Management					
Task 4	Plan				
		Database	3500	3500	3500
		Continuous		2600	2600
		Discrete		2600	2600
		Tidal		2426	2426
		Sediment demand		3830	3830
		Modeling	4087	4087	4087
Task 5 Reporting					
		Database	5526	5526	5526
		Continuous	1300	1300	1300
		Discrete	1300	1300	1300
		Tidal	607	607	607
		Biomarker	1944	1944	1944
		Sediment demand	3831	3831	3831
		Modeling	3500	3500	3500
Total			204167	204167	171390

Oxygen Depletion

YEAR 3

Task		Jly-Sep 01	Oct-Dec 01	Jan-Mar 02	Apr-Jun 02
Project					
Task 1	Management				
	Technical	8158	8158	8158	8158
	CSUS Foundation (20%)	31344	31344	31344	31344
Task 2	Data Collection				
	Database	6692	6692	6692	6692
	Continuous	3842	3842	0	0
	Discrete	14907	14907	0	0
	Tidal	20128	20128		
	Biomarker	23333	23333		
	Sediment demand	53793	53793		
Data synthesis and modeling					
Task 3	Data synthesis				
	Conintuous			19505	19505
	Discrete			27022	27022
	Tidal			1313	1313
	Biomarker			7778	7778
	Sediment demand			16152	16152
Modeling					
	Modeling	16375	16375	16375	16375
Alternatives and Management					
Task 4	Plan				
	Database	3500	3500	3500	3500
	Continuous			2600	2600
	Discrete			2600	2600
	Tidal			2426	2426
	Sediment demand			3830	3830
	Modeling	4087	4087	4087	4087
Task 5	Reporting				
	Database	5526	5526	5526	5526
	Continuous	1300	1300	1300	1300
	Discrete	1300	1300	1300	1300
	Tidal	607	607	607	607
	Biomarker	1944	1944	1944	1944
	Sediment demand	3831	3831	3831	3831
	Modeling	3500	3500	3500	3500
Total		204167	204167	171390	171390

Oxygen Depletion

Task		Total Year 1	Total Year 2	Total Year 3
Task 1	Project Management			
	Technical	32632	32632	32632
	CSUS Foundation (20%)	144400	125376	125376
Task 2	Data Collection	0	0	0
	Database	26768	26768	26768
	Continuous	108124	7684	7684
	Discrete	29814	29814	29814
	Tidal	40256	40256	40256
	Biomarker	46666	46666	46666
	Sediment demand	107586	107586	107586
		0	0	0
Task 3	Data synthesis and modeling	0	0	0
	Data synthesis	0	0	0
	Conintuous	39010	39010	39010
	Discrete	54044	54044	54044
	Tidal	2626	2626	2626
	Biomarker	15556	15556	15556
	Sediment demand	32304	32304	32304
		0	0	0
	Modeling	0	0	0
	Modeling	65500	65500	65500
		0	0	0
Task 4	Alternatives and Management Plan	0	0	0
	Database	14000	14000	14000
	Continuous	5200	5200	5200
	Discrete	5200	5200	5200
	Tidal	4852	4852	4852
	Sediment demand	7660	7660	7660
	Modeling	16348	16348	16348
		0	0	0
		0	0	0
		0	0	0
Task 5	Reporting	0	0	0
	Database	22104	22104	22104
	Continuous	5200	5200	5200
	Discrete	5200	5200	5200
	Tidal	2428	2428	2428
	Biomarker	7776	7776	7776
	Sediment demand	15324	15324	15324
	Modeling	14000	14000	14000
Total		870578	751114	751114

Citations

R. Brown. 1998. Potential Solutions for Achieving the San Joaquin River Dissolved Oxygen Objectives. Jones and Stokes Associates, Sacramento, CA

CDWR. 1987-1995. Water Quality Conditions in the Sacramento-San Joaquin Delta. California Department of Water Resources, Sacramento, CA.

CDWR and USBR. 1977. Delta-Suisun Bay Ecological Studies, 1968-1974. A Water Quality Data Report of the Coordinated Monitoring Program.

Chen, C. 1997. Evaluation of alternatives to meet the dissolved oxygen objectives of the lower San Joaquin River. Systech Engineering, Inc.

Chen, C. J. Herr, L. Ziemelis, R. Goldstein and L. Olmsted. In press. Decision support system for total maximum daily load.

Hallock, R., R. Elwell and D. Fry, Jr. 1970. Migration of adult King Salmon in the San Joaquin Delta - as demonstrated by the use of sonic tag. CDFG. Fish Bull. 151.

Kratzer, C. R. and J. L. Shelton. 1998. Water Quality Assessment of the San Joaquin-Tulare Basins, California: Analysis of Available Data on Nutrients and Suspended Sediment in Surface Water, 1972-1990.

Tamás Török

Education

B.S. (Food Sciences)	Humboldt University, Berlin, Germany; 1969
M.S. (Food Microbiology)	Humboldt University, Berlin, Germany; 1971
M.S. (Bioengineering)	Technical University, Budapest, Hungary; 1984
Ph.D. (Microbiology)	A. Jozsef University, Szeged, Hungary; 1982

Positions held

1997-present	Staff scientist, Life Science Division, Lawrence Berkeley National Laboratory
1995 - 1997	Scientist, LSD, LBNL
1992 - 1995	Senior research associate, LSD, LBNL
1988 - 1992	Visiting scientist, USDA Western Regional Research Center, Albany, CA
1974 - 1988	Senior staff scientist, Department of Microbiology, University of Horticulture and Food Sciences, Budapest, Hungary
1971 - 1974	Microbiologist, Center for Food Control and Analysis, Budapest, Hungary

Research interests

- molecular microbial ecology;
- microbial physiology, microbial genetics;
- yeasts, taxonomy, identification, fine structure, genetics of *Saccharomyces cerevisiae*;
- fungi;
- culture collection, strain preservation, maintenance.

Administrative positions

1996 - present	Group Leader, Microbial Genomics, Department for Environmental Biology, LSD, LBNL
1995 - present	Associate Administrator, Center for Environmental Biotechnology, LBNL
1986	Acting head, Department of Microbiology, University of Horticulture and Food Sciences, Budapest, Hungary
1982 - 1988	Curator, National Collection of Industrial and Agricultural Microorganisms, Budapest, Hungary (from 1986 on international depositary authority under the Budapest Treaty)

Award and editorial activity

- "Outstanding Performance Award" from Lawrence Berkeley National Laboratory (1996)
- Member of the Editorial Board for the Journal of Industrial Microbiology and Biotechnology (1996- present)
- Member of the DOE Review Panel for the Initiatives for Proliferation Prevention (IPP) program

Membership in scientific societies

- American Society for Microbiology
- American Society for Industrial Microbiology and Biotechnology
- American Association for the Advancement of Science

Recent research publications and abstracts

- Török, T., D. Rockhold, and A. D. King, Jr. 1993. Use of electrophoretic karyotyping and DNA-DNA hybridization in yeast identification. *Int. J. Food Microbiol.* 19:63-80.
- Cheng, J.-F., Y. Zhu, T. Török, and D. Scott. 1993. Isolation and mapping of chromosome 21 cDNA clones. Abstr. Human Genome Program, Contractor-Grantee Workshop III, Santa Fe, NM, p. 22.
- Rine, J., R. Blajej, J.-F. Cheng, J. C. Gingrich, S. R. Lowry, E. A. Ostrander, S. Scherer, D. Scott, F. Shadravan, T. Török, K. M. Wilson, and Y. Zhu. 1993. A physical and genetic map of human chromosome 21: A prelude. Abstr. Human Genome Program, Contractor-Grantee Workshop III, Santa Fe, NM, p. 42.
- Gingrich, J. C., F. Shadravan, S. Scherer, J.-F. Cheng, Y. Zhu, T. Török, D. Scott, E. A. Ostrander, S. R. Lowry, K. M. Wilson, R. Blajej, and J. Rine. Integrated mapping of human chromosome 21: Characterization of YAC and P1 contigs on 21q22.3; 1993. Isolation and characterization of cDNAs and genetic markers on the chromosome. 4th Int. Workshop on Chromosome 21, Paris, France.
- Cheng, J.-F., Y. Zhu, T. Török, D. Scott, J. Gingrich, F. Shadravan, S. Scherer, E. A. Ostrander, S. Lowry, K. M. Wilson, R. Blajej, and J. Rine. 1993. Integrated mapping of genetic markers, P1 clones and cDNA of human chromosome 21. *Genome Mapping and Sequencing*, Cold Spring Harbor, USA, p. 43.
- Enigl, D. C., A. D. King, Jr., T. Török. 1993. *Talaromyces trachyspermus*, a new heat-resistant mold from fruit juice. *J. Food Protec.* 56:1039-1042.
- Török, T., C. Royer, D. Rockhold, and A. D. King, Jr. 1995. Species-specific DNA-DNA hybridization probing lower eukaryotes using individual whole chromosomes for probe preparation. (US patent granted, Patent No. 5,401,630)
- Mortimer, R. K., T. Török, P. Romano, G. Suzzi, and M. Polsinelli. 1995. *Saccharomyces cerevisiae* is present on the grapes and is introduced into the fermentation must at the time of crushing. 17th Int. Conf. Yeast Genet. Molec. Biol., Lisboa, Portugal, p. S574
- Torok, T., R. K. Mortimer, P. Romano, G. Suzzi and M. Polsinelli. 1996. Quest for wine yeasts - An old story revisited. *J. Ind. Microbiol.*, 17:303-313.
- Torok, T., S. Goldman, and J. C. Hunter-Cevera. 1997. Who is out there? What is it doing? The pros and cons of polyphasic characterization of microbial communities. 8th European Congr. Biotechnol., Budapest, Hungary, p. 144.
- Torok, T., R. Mortimer, P. Romano, and G. Suzzi. 1997. Biodiversity of naturally-occurring *Saccharomyces cerevisiae* wine yeasts. 18th Int. Spec. Symp. Yeasts, Bled, Slovenia, p. P4-06.
- Torok, T., S. Goldman, and J. C. Hunter-Cevera. 1997. Polyphasic characterization of microbial communities in contaminated environments. Spec. Symp. ACS "Emerging Technologies in Hazardous Waste Management", Pittsburgh, PA., p. 215.
- McKinney, N., T. Torok, V. Repin, M. I. Kuzmin, J. C. Hunter-Cevera. 1999. *Bacillus* spp. diversity in Lake Baikal and sediment samples based on the *SaspB* sequences. ASM International Subsurface Microbiology Meeting, Vail, CO, August, 1999.
- Repin, V. T. Torok, M. I. Kuzmin, and J. C. Hunter-Cevera. 1999. Unusual restriction enzyme profile of *Bacillus* spp. isolated from Lake Baikal water and sediment samples. ASM International Subsurface Microbiology Meeting, Vail, CO, August, 1999.
- Torok, T. V. Repin, V. Geletij, and J. C. Hunter-Cevera. 1999. Microbial diversity in Lake Baikal water and sediment samples as determined by an extensive isolation program. ASM International Subsurface Microbiology Meeting, Vail, CO, August, 1999.

***Curriculum Vitae:* WILLIAM M. BERELSON**

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Born: September 15, 1955, New York City

Employment

1996-present Research Associate Professor, University of Southern California
1988-1995 Research Assistant Professor, University of Southern California
1985-1988 Research Associate of Geochemistry (Post-doc), U.S.C.

Education

Ph. D. Geological Sciences (Geochemistry), Studies of water column mixing and benthic exchange of nutrients, carbon and radon in the southern California borderland.
December, 1985, *University of Southern California*, Los Angeles, CA

M.S. Geological Sciences (Sedimentology), Barrier island evolution and its effect on lagoonal sedimentation; Shackleford Banks, Back Sound, and Harkers Island: Cape Lookout National Seashore. September, 1979, *Duke University*, Durham, N.C

B.A. Geological Sciences, June, 1977, Cum Laude, *University of Rochester*, Rochester, N.Y.

PROFESSIONAL AFFILIATIONS, HONORS and SERVICES

American Geophysical Union
Geochemical Society
American Society of Limnologists and Oceanographers
The Oceanography Society

Chemical Oceanography NSF Panelist
US-JGOFS Steering Committee Member (1998-)
Session Organizer and Chair; AGU Meeting, San Francisco, 12/94
Gordon Conference on Chemical Oceanography, Invited Discussion Leader, 6/95
Australian Marine Science Association, Invited Lecture and Discussion Leader, 7/96

RESEARCH INTERESTS

- *Factors that control the cycling of metals and nutrients in coastal and marine sediments, environmental implications.
- *Global budgets of carbon, silica, nitrogen and phosphorus, the role of sediment diagenesis.
- *Calcium carbonate dissolution kinetics and its impact on paleoceanographic reconstruction.
- *In situ device technology.
- *Use of radioisotopes and other tracers for mixing and advection in marine waters and sediments.
- *Environmental applications of radon measurements in air, soil and groundwater.

Selected Publications of W. Berelson

10 Publications Relevant to the Proposed Work

- Berelson, W. M. and D. E. Hammond (1986). The calibration of a new free vehicle benthic flux chamber for use in the deep sea, Deep Sea Research, v. 33, 1439-1454.
- Berelson, W. M., D. E. Hammond, K. L. Smith, R. A. Jahnke, A. H. Devol, K. R. Hinga, G. T. Rowe and F. Sayles (1987). In situ benthic flux measurement devices: bottom lander technology. Invited contribution to Marine Technology Society Journal, v. 21, 26-32.
- Berelson, W. M., D. E. Hammond and K. S. Johnson (1987). Benthic fluxes and the cycling of biogenic silica and carbon in two southern California borderland basins. Geochimica et Cosmochimica Acta, v. 51, 1345-1363.
- Berelson, W. M., D. E. Hammond and P. Giordani (1989). Effect of sea floor disturbance on benthic flux measurements in the continental margin off Southern California, Catalina Basin. Giornale di Geologia, v. 51, 143-150.
- Berelson, W. M. and K. Johnson (1991). Measurements of nutrient and metal fluxes from the seafloor in the area around the Whites Point Sewage Outfall, Los Angeles, CA. Seventh Symposium on Coastal and Ocean Management, Coastal Zone '91.
- McManus, J., D. E. Hammond, W. Berelson, T. E. Kilgore, D. J. DeMaster, O. G. Ragueneau and R. W. Collier (1995). Early diagenesis of biogenic opal: Dissolution rates, kinetics, and paleoceanographic implications. Deep-Sea Research, v. 42, 871-903.
- Berelson, W., J. McManus, K. Coale, K. Johnson, T. Kilgore, D. Burdige and C. Pilskaln (1996). Biogenic matter diagenesis on the sea floor: A comparison between two continental margin transects. Jour. Mar. Res., v. 54, 731-762.
- Hammond, D. E., J. McManus, W. Berelson, T. Kilgore and R. Pope. (1996) Early diagenesis of organic carbon in the equatorial Pacific: Rates and kinetics. Deep-Sea Research, 43, 1365-1412.
- Berelson, W., R. Anderson, J. Dymond, D. DeMaster, D. Hammond, R. Collier, S. Honjo, M. Leinen, J. McManus, R. Pope, C. Smith and M. Stephens (1997). Biogenic budgets of

particle rain, benthic remineralization and sediment accumulation in the Equatorial Pacific. Deep-Sea Res., v. 44, 2251-2282.

Berelson, W., D. Heggie, A. Longmore, T. Kilgore, G. Nicholson and G. Skyring (1998) Benthic nutrient recycling in Port Phillip Bay, Australia. Estuarine, Coastal and Shelf Science, v. 46, 917-934.

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Collaborators

R. Anderson (L.D.E.O.), D. Burdige (O.D.U.), K. Johnson and K. Coale (M.L.M.L.), J. McManus, G. Klinkhammer, J. Dymond and R. Collier (O.S.U.), M. Leinen (U.R.I.), C. Smith (U.H.), D. Demaster (N.C.S.U.), C. Pilskaln (U. Maine), D. Heggie (AGSO, Aust.)
Ph.D. and Post-doc Advisor--D. Hammond (U.S.C.)

CURRICULUM VITAE

Kenneth H. Coale

Moss Landing Marine Laboratories

P.O. Box 450

Moss Landing, California 95039

(831) 755-8655 tel

(831) 753-2826 fax

coale@mlml.calstate.edu

Education:

Ph.D., Biology, University of California, Santa Cruz,

1988

B.A., Biology, University of California, Santa Cruz

1977

Professional Positions:

Acting Director, Moss Landing Marine Laboratories, 1998 to present

Adjunct Professor of Biogeochemistry, Moss Landing Marine Laboratories, 1992-1998.

Lecturer, Institute of Marine Sciences, University of California, Santa Cruz, 1994.

Senior Research Associate, Moss Landing Marine Laboratories, 1990 to 1992.

Postdoctoral Researcher, Moss Landing Marine Laboratories, 1988 to 1990.

Professional Experience:

Interests include a) Trace element biogeochemistry in the California Current; North, South and Equatorial Pacific and Southern Oceans. b) The use of naturally occurring U/Th series radionuclides in the study of biologically mediated chemical scavenging, removal and recycling processes. ^{226}Ra : ^{210}Pb disequilibria to date rockfish otoliths. c) Trace metal speciation and the effect of metal speciation on trace metal limitation of phytoplankton productivity in open ocean and coastal systems. d) The distribution and cycling of trace metals in lacustrine systems. e) Trace metal cycling and removal in hydrothermal plumes. f) The role of continental margins in supplying trace metals to the ocean's interior. g) Lead-210 dating of marine sediments. h) Development of analytical methods for the determination of trace metals in seawater.

Public Service

Served on the National Science Foundation Advisory Panel in Chemical Oceanography. Co-conceived and implemented an aquatic public environmental education event (for the last five years) in Santa Cruz, California, and serves on the Board of Directors of the Land Trust of Santa Cruz County. Associate Editor, Marine Chemistry.

Professional Societies:

American Geophysical Union, The Oceanographic Society, American Chemical Society, American Society of Limnology and Oceanography, International Humic Substances Society, American Association for the Advancement of Science.

Personal: Born 1/24/55, Married 1979; 2 children

Selected Publications:

- Coale, K. H. and K. W. Bruland, 1987. Oceanic Stratified Euphotic Zone as elucidated by ^{234}Th : ^{238}U Disequilibria. *Limnol. Oceanogr.* 32 (1) 189-200.
- Coale, K. H. and K. W. Bruland, 1988. Copper Complexation in the Northeast Pacific. *Limnol. Oceanogr.* 33: 1084-1101.
- Flegal, A. R., J. O. Nriagu, S. Niemeyer and K. H. Coale, 1989. Isotopic Tracers of Lead Contamination in the Great Lakes. *Nature*, 339: 455-458.
- Coale, K. H. and A. R. Flegal, 1989. Copper, Zinc, Cadmium and Lead in Surface Waters of Lakes Erie and Ontario. *Science of the Total Environment*, 87/88, 297-304.
- Flegal, A. R. and K. H. Coale, 1989. Discussion: "Trends in Lead Concentrations in Major U. S. Rivers and Their Relation to Historical Changes in Gasoline-Lead Consumption," by R. B. Alexander and R. A. Smith. *Water Resources Bulletin*, Vol. 25,6, pg. 1-3.
- Coale, K. H., 1990. Labyrinth of Doom: A Device to Minimize the "Swimmer Component" in Sediment Trap Collections. *Limnol. Oceanogr.* 35, 1376-1381.
- Coale, K. H., 1991. The Effects of Iron, Manganese, Copper and Zinc on Primary Production and Biomass in Plankton of the Subarctic Pacific. *Limnology and Oceanography*, 36, 1851-1864.
- Coale, K. H., C. S. Chin, G. J. Massoth, K. S. Johnson and E. T. Baker. 1991. In situ chemical mapping of dissolved iron and manganese in hydrothermal plumes. *Nature*, 352, 325-328.
- Chin, C. S., K. S. Johnson and K. H. Coale, 1992. Spectrophotometric determination of dissolved manganese in natural waters with 1-(2-pyridylazo)-2-naphthol: Application to analysis in situ in hydrothermal plumes. *Marine Chemistry*, 37, 65-82.
- Johnson, K. S., W. M. Berelson, K. H. Coale, T. L. Coley, V. A. Elrod., W. R. Fairey, H. D. Iams, T. E. Kilgore and J. L. Nowicki, 1992. Manganese flux from continental margin sediments in a transect through the oxygen minimum. *Science*, 257, 1242-1245.
- Coale, K. H., P. M. Stout, K. S. Johnson and C. M. Sakamoto. 1992. Shipboard Determination of Copper in Seawater using Flow Injection Analysis with Chemiluminescence Detection. *Analytica Chimica Acta*, vol. 266, issue 2, pp. 345-351.
- Johnson, K. S., K. H. Coale and H. W. Jannasch, 1992. Analytical Chemistry in Oceanography. *Analytical Chemistry*, Vol. 64, No. 2 1065A-1075A.
- Johnson, K. S., K. H. Coale, V. A. Elrod, and N. W. Tindale. 1994. Iron Photochemistry in seawater from the Equatorial Pacific. *Marine Chemistry* 46, 319-334.

- Martin, J. H., K. H. Coale, K. S. Johnson, and 40 others. 1994. Testing the Iron Hypothesis in Ecosystems of the Equatorial Pacific Ocean. *Nature*, 371, 123-129.
- Johnson, K. S., K. H. Coale, W. M. Berelson and R. M. Gordon. 1996. Formation of the Manganese Maximum in the Oxygen Minimum. *Geochimica et Cosmochimica Acta*, 60, 8, 1291-1299.
- Coale, K. H., S. E. Fitzwater, R. M. Gordon and K. S. Johnson. 1996. Iron limits new production and community growth in the equatorial Pacific Ocean. *Nature*, 379, 621-624.
- Coale, K. H., K. S. Johnson, S. E. Fitzwater, R. M. Gordon, S. Tanner, F. P. Chavez, L. Ferioli, C. Sakamoto, P. Rogers, F. Millero, P. Steinberg, P. Nightingale, D. Cooper, W. P. Cochlan, M. R. Landry, J. Constantinou, G. Rollwagen, A. Trasvina and R. Kudela. 1996. A massive phytoplankton bloom induced by an ecosystem-scale iron fertilization experiment in the equatorial Pacific Ocean. *Nature*, 383, 495-501.
- Berelson, W. M., J. McManus, T. Kilgore, D. Hammond, K. Coale, K. Johnson and C. Pilskaln. 1996. Biogenic matter diagenesis on the sea floor: a comparison between two continental margin transects. *Journal of Marine Research*, 54, 731-762.
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- Coale, K. H. 1998. Preface to *Topical Studies in Oceanography, The Galapagos Iron Experiments: A Tribute to John Martin*. *Deep-Sea Research, Part II*, Vol 45, No 6, 915-918.
- Gordon, R. M., K. S. Johnson and K. H. Coale. 1998. The behaviour of iron and other trace elements during the IronEx I and PlumEx experiments in the Equatorial Pacific. *Deep-Sea Research, Part II*, Vol 45, No 6, 995-1041.
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- Zamzow, H., K. H. Coale, K. S. Johnson and C. M. Sakamoto. 1998. Determination of copper complexation in seawater using flow injection analysis with chemiluminescence detection. *Analytica Chimica Acta*, 377, 133-144.

- Colbert, D., K. S. Johnson and K. H. Coale. 1998. Determination of cadmium in seawater using automated on-line preconcentration and direct injection graphite furnace atomic absorption spectrometry. *Analytica Chimica Acta*, 377, 255-262.
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- Andrews, A., K. H. Coale, J. Nowicki, C. Lundstrom, Z. Palacz, E. Burton and G. Cailliet. 1999. Application of a new ion-exchange separation technique and isotope dilution thermal ionization mass spectrometry to ^{226}Ra determination in otoliths for radiometric age determination of long-lived fishes. *Canadian Journal of Fisheries and Aquatic Sciences*, In Press.
- Andrews, A. H., E. J. Burton, K. H. Coale, G. M. Cailliet and R. E. Crabtree. 1999. Application of radiometric age determination to the Atlantic tarpon, *Megalops atlanticus*. *Fishery Bulletin*. In Press.
- Moore, J. K., M. R. Abbott, J. G. Richman, W. O. Smith, T. J. Cowles, K. H. Coale, W. D. Gardner and R. T. Barber. 1999. SeaWiFS Satellite Ocean Color Data from the Southern Ocean. *Geophysical Research Letters*. Submitted.
- Coale, K. H., P. Worsfold and H. deBaar, 1999. Iron in Seawater and the Need for International Intercomparison Studies: A Report from a Subgroup of the Scientific Committee on Ocean Research, Working Group 109, "Biogeochemistry of Iron in Seawater" Amsterdam 1-5 November, 1998. In Press EOS.

We will comply with Interagency Agreements form 4187

Forms

1. Attachments D and E - Table D-1

APPLICATION FOR FEDERAL ASSISTANCE

OMB Approval No. 0348-00-

1. TYPE OF SUBMISSION:		2. DATE SUBMITTED <u>April 16, 1999</u>	Applicant Identifier
Application <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Non-Construction	Preapplication <input type="checkbox"/> Construction <input type="checkbox"/> Non-Construction	3. DATE RECEIVED BY STATE	State Application Identifier
		4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier

5. APPLICANT INFORMATION	
Legal Name: <u>CA Dept. of Water Resources</u>	Organizational Unit: <u>Environmental Services Office</u>
Address (give city, county, State, and zip code): <u>3251 "S" Street Sacramento CA 95816</u>	
Name and telephone number of person to be contacted on matters involving this application (give area code): <u>Peggy Lehman (916) 227-7551</u>	

6. EMPLOYER IDENTIFICATION NUMBER (EIN): <u>94-6355570</u>		7. TYPE OF APPLICANT: (enter appropriate letter in box)															
		<table border="0"> <tr> <td>A. State</td> <td>H. Independent School Dist.</td> </tr> <tr> <td>B. County</td> <td>I. State Controlled Institution of Higher Learning</td> </tr> <tr> <td>C. Municipal</td> <td>J. Private University</td> </tr> <tr> <td>D. Township</td> <td>K. Indian Tribe</td> </tr> <tr> <td>E. Interstate</td> <td>L. Individual</td> </tr> <tr> <td>F. Intermunicipal</td> <td>M. Profit Organization</td> </tr> <tr> <td>G. Special District</td> <td>N. Other (Specify) _____</td> </tr> </table>		A. State	H. Independent School Dist.	B. County	I. State Controlled Institution of Higher Learning	C. Municipal	J. Private University	D. Township	K. Indian Tribe	E. Interstate	L. Individual	F. Intermunicipal	M. Profit Organization	G. Special District	N. Other (Specify) _____
A. State	H. Independent School Dist.																
B. County	I. State Controlled Institution of Higher Learning																
C. Municipal	J. Private University																
D. Township	K. Indian Tribe																
E. Interstate	L. Individual																
F. Intermunicipal	M. Profit Organization																
G. Special District	N. Other (Specify) _____																
8. TYPE OF APPLICATION:																	
<input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision																	
If Revision, enter appropriate letter(s) in box(es) <input type="checkbox"/> <input type="checkbox"/>																	
A. Increase Award B. Decrease Award C. Increase Duration D. Decrease Duration Other (specify): _____																	

9. NAME OF FEDERAL AGENCY: <u>US Fish & Wildlife Service</u>	
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10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: <u>N/A</u>		11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT: <u>Determination of the Causes of Dissolved Oxygen Depletion in the San Joaquin River</u>	
12. AREAS AFFECTED BY PROJECT (Cities, Counties, States, etc.): <u>San Joaquin County</u>			

13. PROPOSED PROJECT		14. CONGRESSIONAL DISTRICTS OF:	
Start Date <u>8/99</u>	Ending Date <u>12/00</u>	a. Applicant <u>3, 5</u>	b. Project <u>3</u>
ESTIMATED FUNDING:		16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?	
Federal	\$ <u>2,370,928 (866,408 Phase I)</u>	a. YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON: DATE _____	
Applicant	\$ _____	b. No. <input type="checkbox"/> PROGRAM IS NOT COVERED BY E. O. 12372 <input type="checkbox"/> OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW	
State	\$ _____		
Local	\$ _____		
Other	\$ _____		
Program Income	\$ _____		
TOTAL	\$ _____	17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT? <input type="checkbox"/> Yes If "Yes," attach an explanation. <input type="checkbox"/> No	

TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT, THE APPLICANT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Name of Authorized Representative <u>Dr. Randall L. Brown</u>	b. Title <u>Chief, Environmental Services Office</u>	c. Telephone Number <u>(916) 227-7531</u>
d. Signature of Authorized Representative <u>for RL Brown</u>	e. Date Signed <u>April 16, 1999</u>	

Standard Form 424 (Rev. 7-97)
Prescribed by OMB Circular A-102

BUDGET INFORMATION - Non-Construction Programs

Grant Program Function or Activity (a)		Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		Total (g)
			Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	
1. Year 1			\$	\$	\$ 866,408	\$	\$ 866,408
2. Year 2					752,260		752,260
3. Year 3					752,260		752,260
4.							
5. Totals			\$	\$	\$ 2,370,928	\$	\$ 2,370,928
SECTION B - BUDGET CATEGORIES							
Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)		
	(1)	(2)	(3)	(4)			
a. Personnel	\$ 304,791	\$ 299,791	\$ 299,791	\$	\$ 904,373		
b. Fringe Benefits	224,849	219,849	219,849		664,547		
c. Travel							
d. Equipment	84,627	48,627	48,627		181,871		
e. Supplies							
f. Contractual	107,740	57,740	57,740		223,220		
g. Construction							
h. Other							
i. Total Direct Charges (sum of 6a-6h)							
j. Indirect Charges	144,401	125,377	125,377		395,155		
k. TOTALS (sum of 6i and 6j)	\$ 866,408	\$ 752,260	\$ 752,260	\$	\$ 2,370,928		
7. Program Income	\$	\$	\$	\$	\$		

Previous Edition Usable

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Standard Form 424A (Rev. 4-92)
Prescribed by OMB Circular A-102

SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8.	\$	\$	\$	\$	
9.					
10.					
11.					
12. TOTAL (sum of lines 8 - 11)	\$	\$	\$	\$	
SECTION D - FORECASTED CASH NEEDS					
Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
13. Federal	\$	\$	\$	\$	
14. NonFederal					
15. TOTAL (sum of lines 13 and 14)					
SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program	FUTURE FUNDING PERIODS (Years)				
	(b) First	(c) Second	(d) Third	(e) Fourth	
16. <i>August 1999 - December 2001</i>	\$ 866,408	\$ 752,260	\$ 752,260	\$	
17.					
18.					
19.					
20. TOTAL (sum of lines 16-19)	\$ 866,408	\$ 752,260	\$ 752,260	\$	
SECTION F - OTHER BUDGET INFORMATION					
21. Direct Charges:	22. Indirect Charges:				
23. Remarks:					

U.S. Department of the Interior

**Certifications Regarding Debarment, Suspension and
Other Responsibility Matters, Drug-Free Workplace
Requirements and Lobbying**

Persons signing this form should refer to the regulations referenced below for complete instructions:

Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions - The prospective primary participant further agrees by submitting this proposal that it will include the clause titled, "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions. See below for language to be used; use this form for certification and sign; or use Department of the Interior Form 1954 (DI-1954). (See Appendix A of Subpart D of 43 CFR Part 12.)

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions - (See Appendix B of Subpart D of 43 CFR Part 12.)

Certification Regarding Drug-Free Workplace Requirements - Alternate I. (Grantees Other Than Individuals) and Alternate II. (Grantees Who are Individuals) - (See Appendix C of Subpart D of 43 CFR Part 12.)

Signature on this form provides for compliance with certification requirements under 43 CFR Parts 12 and 18. The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of the Interior determines to award the covered transaction, grant, cooperative agreement or loan.

**PART A: Certification Regarding Debarment, Suspension, and Other Responsibility Matters -
Primary Covered Transactions**

CHECK IF THIS CERTIFICATION IS FOR A PRIMARY COVERED TRANSACTION AND IS APPLICABLE.

- (1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
- (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
 - (d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- (2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**PART B: Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion -
Lower Tier Covered Transactions**

CHECK IF THIS CERTIFICATION IS FOR A LOWER TIER COVERED TRANSACTION AND IS APPLICABLE.

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

PART C: Certification Regarding Drug-Free Workplace Requirements

~~CHECK~~ ☒ IF THIS CERTIFICATION IS FOR AN APPLICANT WHO IS NOT AN INDIVIDUAL

Alternate I. (Grantees Other Than Individuals)

A. The grantee certifies that it will or continue to provide a drug-free workplace by:

- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (b) Establishing an ongoing drug-free awareness program to inform employees about—
 - (1) The dangers of drug abuse in the workplace;
 - (2) The grantee's policy of maintaining a drug-free workplace;
 - (3) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
- (c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);
- (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will —
 - (1) Abide by the terms of the statement; and
 - (2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;
- (e) Notifying the agency in writing, within ten calendar days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification numbers(s) of each affected grant;
- (f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted —
 - (1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
 - (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
- (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a) (b), (c), (d), (e) and (f).

B. The grantee may insert in the space provided below the site(s) for the performance of work done in connection with the specific grant:

Place of Performance (Street address, city, county, state, zip code)

Environmental Services Office
3251 S Street Sacramento CA 95816

Check ☐ if there are workplaces on file that are not identified here.

PART D: Certification Regarding Drug-Free Workplace Requirements

CHECK ☐ IF THIS CERTIFICATION IS FOR AN APPLICANT WHO IS AN INDIVIDUAL

Alternate II. (Grantees Who Are Individuals)

- (a) The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant;
- (b) If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any grant activity, he or she will report the conviction, in writing, within 10 calendar days of the conviction, to the grant officer or other designee, unless the Federal agency designates a central point for the receipt of such notices. When notice is made to such a central point, it shall include the identification number(s) of each affected grant.

PART E: Certification Regarding Lobbying
Certification for Contracts, Grants, Loans, and Cooperative Agreements

CHECK IF CERTIFICATION IS FOR THE AWARD OF ANY OF THE FOLLOWING AND THE AMOUNT EXCEEDS \$100,000: A FEDERAL GRANT OR COOPERATIVE AGREEMENT; SUBCONTRACT, OR SUBGRANT UNDER THE GRANT OR COOPERATIVE AGREEMENT.

CHECK IF CERTIFICATION IS FOR THE AWARD OF A FEDERAL LOAN EXCEEDING THE AMOUNT OF \$150,000, OR A SUBGRANT OR SUBCONTRACT EXCEEDING \$100,000, UNDER THE LOAN.

The undersigned certifies, to the best of his or her knowledge and belief, that:

- (1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- (3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

As the authorized certifying official, I hereby certify that the above specified certifications are true.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL

Dale K. Hoff - FLL for

TYPED NAME AND TITLE

Dr Randall L Brown, Chief Environmental Services Office

DATE

April 16, 1999

ASSURANCES - NON-CONSTRUCTION PROGRAMS

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL

Dale K. Haff - Elouh
for RL Brown

TITLE

Chief, Environmental Services
Office

APPLICANT ORGANIZATION

California Department of Water Resources

DATE SUBMITTED

4/16/99